



Technological Determinism and Singularity in Clarke & Kubrick's 2001: A Space Odyssey

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Abstract

Arthur C. Clarke and Stanley Kubrick's timeless work of science fiction, *2001: A Space Odyssey* (1968) offers a visionary insight on various philosophical issues. This article discusses that *2001*'s central focus fundamentally relies on technological determinism, leading to technological singularity and, eventually, a posthuman existence of the human race. While outlining technological determinism, the article also sheds light on its relationship with associated key concepts such as normative phenomena, permissionless innovation and technocratic governing mentalities. These notions mainly reveal Clarke and Kubrick's views of the universe, which are embedded in the subtext of the novel and the film. While comparing and contrasting the novel and the film, the study puts forward their similarities and differences. The theoretical framework explores technological determinism, singularity and posthumanism with references to various sources and the following section puts the novel/film in spotlight by demonstrating how and to what extent Clarke and Kubrick have manifested their ideas regarding technological determinism and singularity in this complex masterpiece contemplating the author's and director's unique extrapolations of humanity's future. The article concludes that Clarke and Kubrick signal the coming of the posthuman era.

Keywords: *2001: A Space Odyssey*, Arthur C. Clarke, Stanley Kubrick, technological determinism, technological singularity.

Clarke ve Kubrick'in 2001: Bir Uzay Destanı adlı eserinde Teknolojik Determinizm ve Tekillik

Öz

Arthur C. Clarke ve Stanley Kubrick'in zamansız bilimkurgu eseri *2001: Bir Uzay Destanı* (1968), çeşitli felsefi konulara ilişkin vizyoner bir bakış açısı sunar. Bu makale, *2001*'in odak noktasının, teknolojik determinizme dayandığını, bunun da teknolojik tekillik ve nihayetinde insan ırkının insan sonrası bir varoluşuna yol açtığını tartışmaktadır. Teknolojik determinizmi özetlerken, makale aynı zamanda normatif fenomenler, izinsiz yenilik ve teknokratik yönetim zihniyetleri gibi ilgili temel kavramlarla olan ilişkisine de ışık tutar. Bu kavramlar, Clarke ve Kubrick'in roman ve filmin alt metnine yerleştirilen evren görüşlerini ortaya koyar. Roman ve filmi karşılaştırıp ele alırken, çalışma bu iki eserin benzerliklerini ve farklılıklarını ortaya koyar. Teorik çerçeve, teknolojik determinizm, tekillik ve posthümanizmi çeşitli kaynaklara referansla incelerken, bir sonraki bölüm romanı/filmi odak noktası haline getirerek Clarke ve Kubrick'in teknolojik determinizm ve tekillik konusundaki fikirlerini bu karmaşık başyapıtta nasıl ve ne ölçüde ortaya koyduklarını gösterir. Bu çalışma, yazar ve yönetmenin insanlığın geleceğine dair benzersiz öngörülerini ele alır. Makale, Clarke ve Kubrick'in insan sonrası dönemin gelişine işaret ettikleri sonucuna varır.

Anahtar Kelimeler: *2001: Bir Uzay Destanı*, Arthur C. Clarke, Stanley Kubrick, teknolojik determinizm, teknolojik tekillik.

INTRODUCTION

2001: A Space Odyssey (1968) has a complex plot consisting of three distinct narratives that seem to be disconnected from one another and, for this reason, are open for interpretation (Kramer, 2010, p. 9). The first section, "The Dawn of Man" goes back to prehistoric times to re-visualize the primitive lives of hominids. The second section, "Jupiter Mission," is situated around the Orbit of Jupiter and a flash-forward into the 21st century has taken place. The third and last section, "Jupiter and Beyond the Infinite" represents the expansion of humanity beyond Jupiter into infinity. Since the film was released before the novel, both Clarke and Kubrick are granted credit for the work though the author of the novel is only Clarke. Possessing an unusual and intriguing plot, *2001* sheds light on a wide variety of issues and philosophical ideas such as human evolution, consciousness, anthropocentrism and humanity's dependence on technology. This article argues that *2001* is largely based on technological determinism which leads to technological singularity and eventually the posthuman phase of humanity. It also defends that Clarke and Kubrick, despite issuing warnings against the possible perils of singularity, acknowledge and advocate the posthuman future. Many scholarly articles have been published on *2001*, focusing on various issues such as religion, ethics, evolution, gender and the Anthropocene. However, none of them have addressed the notions of technological determinism and singularity. This article is relevant to today's technological developments, particularly with the rapid advancements in AI, automation, and biotechnology. As debates over AI ethics, human enhancement, and the potential for AI to surpass human intelligence intensify, *2001* provides an essential lens through which to examine these emerging challenges, making its themes especially relevant in current debates about the future of technology and its implications for humanity.

Technological Determinism and Singularity

Technology stands at the very centre of human society. Regardless of age, technology and technological development have managed to shape and transform human existence on earth. Human lifestyle and the cultural values constructed around this lifestyle have often come to emerge as a direct or indirect result of technological inventions and innovations. In addition to shaping culture, technology also holds the ability to play a determining role in the advancement of nations. Hence, those in possession of technology may progress quicker and more effectively compared to those who are deprived of it. History is full of such examples; the Europeans had little or no idea about the Western hemisphere until they began using the compass and other tools of navigation, which enabled them to cross the Atlantic and discover the American continent (Smith & Marx, 1994, p. x). These technological devices granted Europeans the advantage to not only colonize new lands but also to spread their culture and gain large amounts of raw material and wealth. Likewise, the use of the printing press is, according to many, the essential element that made the Reformation possible. Before its widespread use, only a select clergy could possess and read the Bible. However, after Gutenberg's invention, every individual obtained the chance to own and read the book of God without the need for an intermediary (1994, p. x). These examples point out to technology's role as a game changer or "*as an independent entity, a virtually autonomous agent of change*" (Smith & Marx, 1994, p. xi). It is clear that, albeit not the only one, technology is among the major determining forces of humanity.

In addition to technology, determinism is a concept that has been continuously debated by many thinkers and scholars throughout the ages. Determinism is predominantly based on two arguments: "*I) every actual state or event has a cause and II) any cause – i.e. any set of factors that bring about a state or an event is necessitating*" (Salles, 2013, p. 60). Determinism posits that every action takes place with a cause. According to this reasoning, no action can take place out of itself, completely autonomously and every action occurs as a result of previous causes. Moreover, determinism is a broad notion which includes different types and sub-categories. Among these various types, technological

determinism stands out. The term was coined by an American economist and sociologist Thorstein Veblen, whose conceptual model holds that technology is principally the bringer of change (Papageorgiou & Michaelides, 2013, p. 7). Veblen defined technology as: *"a joint stock of knowledge derived from past experience and is held and passes on as an invisible possession of the community at large"* (2013, p. 19). Another definition views technological determinism as the theory in which technology structures society and, in turn, the development of capitalism (Papageorgiou & Michaelides, 2013, p. 8). This definition draws attention to technology's reciprocal bond with capitalism. Technological determinism puts forward that: *"(1) technology is an independent factor or an autonomous force; and (2) technological change causes social change"* (Feng, 2022, p. 1392). To this end, technology constitutes the major determining factor in the universe. It is the major element that drives and causes social change and progress in society. The argument that technology is totally self-sufficient and that it is the absolute factor behind social change denotes *"hard technological determinism"* whereas the statement that technology is relatively independent and that is not the only factor causing social change is associated with *"soft technological determinism"* (Feng, 2022, p. 1392). Thus, the difference between hard and soft technological determinism lies in the extent of commitment to technology as well as in its degree of autonomy. The sociological interpretation of technology posits that material assets are given preference in the case of technology determinism (Feng, 2022, p. 1392). According to technological determinists, technology can set social norms because it is based on previously developed technology and is then embraced by society (2022, p. 1392). The Industrial Revolution forms a major historical example concerning the immense social impact of technology on the lives of the masses in socio-economic terms (Feng, 2022, p. 1392). In the aftermath of this process, the working hours, social lives and whole lifestyles of the working population were altered drastically.

Technological determinism and innovation without permission are identified as normative phenomena and it is emphasized that *"their foundational beliefs, ideas, and assumptions constitute governing mentalities that shape discourse, thinking and action regarding technological innovation to the advantage of a narrow range of elite actors"* (Dotson, 2015, p. 99). In this regard, technological determinism is accused to be of undemocratic nature, to remain at the control of a select minority and hence coined as technocratic governing mentalities (2015, p. 99). At the very core of Dotson's argument lies the fact that technological determinism is undemocratic in nature and does not provide benefits for the majority of the population but only serves the ruling elite. Furthermore, it also forms an obstacle for democratic decision-making concerning the course of technological progress (Dotson, 2015, p. 103). Hence, technological determinism normalizes technological change and provides protection to those in charge of implementing the changes from criticism (2015, p. 103). In this respect, Sadowski and Selinger contend that *"by focusing on technology as the dominant force in society—a force that progresses in inevitable ways—technocrats can justify their actions as merely being the outcome of rational, mechanical processes"* (2014, p. 166). To that end, technology enables technocrats the means to rationalize their actions and to convince the masses to take them for granted. In addition, Sally Wyatt asserts that *"one of the problems with technological determinism is that it leaves no space for human choice or intervention and, moreover, absolves us from responsibility for the technologies we make and use"* (2008, p. 169). Another issue relevant to technological determinism is permissionless innovation coined by internet developer Vinton Cerf, who pointed out that internet innovations lack significant regulatory control (Dotson, 2015, p. 104). Permissionless innovation is described as:

The notion that experimentation with new technologies and business models should generally be permitted by default. Unless a compelling case can be made that a new invention will bring serious harm to society, innovation should be allowed to continue unabated and problems, if they develop at all, can be addressed later. [...] Permissionless innovation is about the creativity of the human mind to run wild in its inherent curiosity and inventiveness. Such unencumbered inventiveness is viewed as

necessary to enable new technologies to usher in amazing, life-enriching changes. (Thierer, 2014, pp. vii, 3)

As a result of this aspect, technological innovation and productivity menaces to put into practice prejudice for the advantage of an elite number of customers, entrepreneurs and large businesses (Dotson, 2015, p. 105). For this reason, technology is thus predominantly at the service of a select elite who utilize, profit and fully benefit from these innovations. The same elite also serve as decision-makers in the name of the masses. All these aspects highlight the undemocratic nature of technology and its impact on technological determinism which brings forward the risk as a consequence of the bias towards the dangers deemed to be relatively harmless. Dotson purports that *"the rhetoric of permissionless innovation shifts attention away from the democratic decision-making rights of stakeholders who are potentially affected negatively by technological innovation and toward the liberties of innovators, corporations, and affluent customers"* (2015, p. 105). Given that technology determines and drives history, an aspect such as permissionless innovation brings forward several risks and drawbacks concerning the well-being of society and the people. Hence, all these aspects exemplify the possible drawbacks of technology and technological determinism. Another issue that needs to be addressed are the probable consequences of technological determinism. In her recent article, Sally Wyatt advocates for revisiting technological determinism with renewed seriousness and suggests turning to science fiction as a lens to rethink the relationship between technology and society (2023, p. 26). In this framework, the following section will shed light on technological singularity as an outcome of technological determinism.

There is no doubt that technology is developing at a rapid pace. Along with the constantly rising development, technological capability is likely to go beyond human imagination. This unpredictable condition is described with the term technological singularity first used by John von Neumann (1903-1957) in Bulletin of the American Mathematical Society 64 93, part 20 but made popular by Ray Kurzweil in his 2005 book, *The Singularity Is Near - When Humans Transcend Biology* (Kurzweil as cited in Shanahan, 2015, p. 233). Roughly defined:

In physics, a singularity is a point in space or time, such as the center of a black hole or the instant of the Big Bang, where mathematics breaks down and our capacity for comprehension along with it. By analogy, a singularity in human history would occur if exponential technological progress brought about such dramatic change that human affairs as we understand them today came to an end. (Shanahan, 2015, p. xv)

Murray Shanahan goes further to argue that technological singularity might be triggered and accelerated by significant developments in the fields of artificial intelligence (AI) and neurotechnology (2015, p. xvi). Thus, in accordance with the singularity hypothesis, common human beings are removed from the society, are unable to keep up with the routine and are overruled by superior machines or enhanced biological beings (2015, p. xvi). Another definition describes the term as: *"a point at which a function is not defined is called a singularity in mathematics. By analogy, a hypothetical point at which technological progress becomes unbounded is called a technological singularity"* (Potapov, 2018, p. 1). Shanahan draws attention to the perils of artificial intelligence since intelligence is the very factor that is being engineered, it can start working on advancing itself (2015, p. xvii). To this end, it would not be surprising for humans to witness artificial intelligence growing out of control and reaching an unprecedented level of advancement. This was foreseen decades ago by pioneer SF author, Isaac Asimov (1920-1992), who professed that: *"The saddest aspect of life, right now is that science gathers knowledge faster than society gathers wisdom"* (Asimov & Shulman, 1988, p. 281). In the subtext of this quote, Asimov implies that the development of science and technology far surpasses that of the society and this fact will inevitably cause unseen problems in the future. In this respect, technology's growth manifests at a disproportionate speed in comparison with the advancement of society. As a visionary scientist, Asimov

projected a great deal of aspects regarding the future of society. In my viewpoint, not only humanity's wisdom, but also its moral development fell behind the dazzling progress of technology. It is exactly this condition that might bring about dreadful results as overdeveloped technology at the hands of underdeveloped morality could easily lead to catastrophe. In this respect, Vernor Vinge claims that singularity is coming and is unstoppable considering technological progress and human competitiveness (2003, p. 4). In addition, he argues that it could lead humanity into a golden age which might make immortality an attainable objective (Vinge, 2003, p. 7). Moreover, technological singularity is articulated as:

A future period during which the pace of technological change will be so rapid, its impact so deep, that human life will be irreversibly transformed. [...] This epoch will transform the concepts that we rely on to give meaning to our lives, from our business models to the cycle of human life, including death itself. (Kurzweil, 2005, p. 24)

The scholar proposes that the understanding of singularity is a necessity and calls those who understand and come to terms with the notion, singularitytarians. In addition, the scientist proposes another term: the law of accelerating returns which he clarifies as the inherent escalating of evolution, with technological progress representing an extension of biological evolution (Kurzweil, 2005, p. 24). Thus, technological advancement is regarded as a continuation of human evolution. Moreover, in his book, Kurzweil argues that in a few decades, information-based technologies will exceed all human activities, including intellectual, emotional and cognitive skills (2005, p. 25). As a result, singularity will enable humans to transcend all limitations related to their brains and bodies and outlive the restrictions imposed on them by their physical forms (2005, p. 25). It is worth noting that Kurzweil's vision of singularity is mostly optimistic and idealistic in nature. The scientist mostly focuses on the positive impact of singularity on humans and the society and leaves out what I would name: "singularity gone wrong". It seems as if he takes it for granted that singularity will ensure a revolutionary breakthrough for humanity's future but such a one-sided view ought to be questioned and reflected upon. It is natural that singularity will impact future humanity in various positive ways yet this does not mean that it will not possess drawbacks or negative outcomes on the whole. Therefore, Kurzweil's position on singularity is partly utopian but also problematic due to his one-sided approach. This position is criticized by Ben Goertzel who draws attention to unpredictability and discusses that humans can never be certain about what singularity will bring (2007, p. 1172). In addition, Kurzweil published a recent book entitled *The Singularity is Nearer* (2024), where he asserts that nanotechnology will drive the development of virtual neurons in the cloud, enabling the direct expansion of our brains and merging us with AI (2024, p. 1). This fusion will amplify our computational power millions of times beyond our biological limits, profoundly enhancing our intelligence and consciousness to an almost incomprehensible degree—a transformation he refers to as the singularity (2024, p. 1). In short, the author proclaims that with the current progress, the society is approaching a singularity.

On the other hand, philosopher David J. Chalmers defends that singularity as a possibility ought to be taken seriously as it will manifest significant effects (2010, p. 3). Chalmers takes a more neutral position compared to Kurzweil and evaluates singularity from an objective perspective, taking into consideration both its advantages and possible harms, raising awareness that it has the potential to end the human race (2010, p. 4). He speculates about the post-singularity era and postulates that AI similar to human consciousness level is a probable outcome (2010, p. 9). A possible resolution suggested by Chalmers to the risks of AI in the post-singularity era is to simulate these in virtual environments to ensure their safety before demonstrating them in reality (2010, p. 30). The philosopher concludes that singularity is not far-fetched and humans ought to integrate values into AI and initiate the first AI in the virtual space as major precautions (2010, p. 54). In this respect, Chalmers' views on singularity are

realistic, tangible and presumable. Additionally, technological singularity, as described by Vernor Vinge in his 1993 essay, "The Coming Technological Singularity", refers to the point at which artificial intelligences exceed human intelligence, a milestone he predicted could occur within thirty years, ultimately bringing an end to the human era and paving the way for superhuman intelligence (Vinge as cited in Sirius & Cornell, 2015, pp. 214-215). The central question concerns whether humans will experience a hard or soft takeoff into the technological singularity (Sirius & Cornell, 2015, p. 215).

Overall, technological singularity has been elaborated and discussed by many scholars and thinkers who stated their position. It is interesting to note that some approach the notion from a predominantly utopian/optimistic perspective whereas others attempt to evaluate the concept in more objective/realistic terms. Technological singularity is likely to take place in the future, however its positive and negative effects are only eligible for speculative prediction. For the moment, it is impossible to predict the exact consequences of technological singularity and its impact on the world. On the other hand, the extent of the singularity's effects will largely depend on the degree of technological sophistication. The more sophisticated, the more radical effects it will bring about. Nevertheless, technological singularity will certainly transform human society in an unexplored and unforeseen direction.

Clarke and Kubrick's Prescient Visions: *2001: A Space Odyssey*

It is obvious that Arthur C. Clarke and Stanley Kubrick were visionaries of their era as their works were ahead of their time. Both the novel and the film were released in 1968, a period when space exploration was at its peak but also a period when computer technology, AI and neurotechnology were not common in daily life. As Clarke's 12th novel and Kubrick's 7th film, *2001* was met with mixed reception at the time. A unique characteristic of this canonical work is that the novel was written parallel to the film's screenplay which means that the novel and the film were both produced synchronously (Krämer, 2010, p. 8). The novel was published after the film and it is known that Kubrick contributed to Clarke's novel although his name does not appear as a writer. It is commonly acknowledged that *2001* was inspired by Clarke's earlier published story "The Sentinel" (1951), a bleaker plot which for the very first time mentioned the discovery of an alien artefact on the moon that provides a form of connection with alien life forms (Poole, 2018, p. 113). While both works deal with similar themes, *2001* is mostly regarded as an expansion and elaboration of the original story. Thus, for the analysis of this work, it would not be rational to separate the novel from the film as both are interconnected. The film is widely considered to be one of the best films ever produced (Krämer, 2010, p. 10) and is without doubt a cinematic masterpiece.

Consisting of three distinct and unrelated sections, *2001* is an overwhelming and complex work of fiction/cinema that focuses on a variety of issues Clarke and Kubrick leave open for interpretation. Many scholars and critics have associated the work with Nietzschean philosophy and concepts such as the *übermensch*, will to power and eternal recurrence. *2001* reflects Nietzschean ideas through the concept of the *Übermensch*, seen in Dave Bowman's transformation into the Star Child, a being that transcends human limitations and signals a new stage of existence. The will to power is expressed through humanity's evolutionary drive, as the monolith intervenes to push both the apes and later humanity toward higher levels of intelligence and capability. The eternal recurrence is suggested through the film's cyclical structure, where patterns of death, rebirth, and transformation—most notably Bowman's journey through the Star Gate—emphasize the endless progression and renewal of life. According to Jerold Abrams, Kubrick recognized the vision of a real prophet in Zarathustra and envisioned the future of technology as the fulfilment of that vision. *2001* follows the same Nietzschean pre- and posthuman phases, beginning with ape-men and progressing through humanity to a new form, the Star Child (Abrams, 2007, pp. 247-248). While these associations remain debatable, I argue that *2001*

is a manifestation of technological determinism and a postulation of technological singularity. The novel and the film both demonstrate that technology is the major determining force in the universe and for humanity in particular.

Technology stands at the very centre of 2001 as it is not only one of the themes of the work but also the main focus which Clarke and Kubrick have relied on to embed their implications. It would be impossible to analyse 2001 without concentrating on technology as it maintains a firm dominance over the novel and film. From its beginning until the end, 2001 is a predication of technology and technological determinism. It insinuates that technology is the major determining factor in the universe and this is mainly supported by the presence of the monoliths and their impact in the novel/film. The monoliths are black pieces of rock that appear out of nowhere and cause drastic changes. The emergence of the first monolith is described as:

It was a rectangular slab, three times his height but narrow enough to span with his arms, and it was made of some completely transparent material; indeed, it was not easy to see except when the rising sun glinted on its edges. As Moon-Watcher had never encountered ice, or even crystal-clear water, there were no natural objects to which he could compare this apparition. It was certainly rather attractive, and though he was wisely cautious of most new things, he did not hesitate for long before sidling up to it. As nothing happened, he put out his hand, and felt a cold, hard surface. (Clarke, 1968, p. 8)

The monolith is an enigmatic object whose mystery reigns throughout the novel/film but nevertheless whose silent force opens up new eras of evolution and progress. As an ambiguous object, the monolith has various interpretations, one of which asserts that it resembles something that could have been produced by earth artists and minimalists and serves as a primary symbol and catalyst for evolutionary leaps forward (Wamberg, 2020, p. 38). Each time the monolith appears, a leap forward in evolution and time takes place. This reveals the function of the monolith in Clarke and Kubrick's narrative. While the origin of this mystifying object is unknown, four monoliths have been exposed in the novel/film: the first one appears in Africa, the second one on the moon, the third monolith between Io and Jupiter and the last in the hotel suite of Bowman (Vacker, 2018, p. 59). In 2001, the monoliths serve as evidence of technological determinism as they consolidate theories concerning the presence of technological determinism. In the novel and film, all human evolution is foretold and interpreted from the perspective of technological progress. From the African hominids to the astronauts in space, human development is measured by the extent of sophistication and utilization of technology. In prehistoric times, technology emerges with the use of bones as a weapon and progresses at an exhilarating speed. The novel and the film indicate that technology determines the course of human progress. The quest begins with the primitive tool of animal bones, leaps forward to spacecrafts, satellites, AI computer depicted by HAL, flat screens, glass cockpits and the several monoliths appearing on critical occasions. The emergence of the monoliths is a reference to Clarke and Kubrick's views of alien/extra-terrestrial interference in the universe. The authors hint at the speculative hypothesis which implies that aliens are interfering and/or have interfered in the course of human evolution. In an interview, Kubrick expressed his belief in extra-terrestrial life forms:

Given a planet in a stable orbit, not too hot and not too cold, and given a few billion years of chance chemical reactions created by the interaction of a sun's energy on the planet's chemicals, it's fairly certain that life in one form or another will eventually emerge. (Kubrick as cited in Vacker, 2018, p. 57)

Clarke, on the other hand, expressed his views on this issue in *Report on Planet Three* where he mentions that very few astronomers would take it seriously that humans are the only life form in the universe (Clarke, 2011, p. 88). The author concludes by asserting that: "if we can learn to live with ourselves we will at least improve our chances of living with aliens" (2011, p. 99).

2001 is a manifestation of hard technological determinism and this is prevalent throughout the novel/film from the beginning until its last page/scene. In Clarke and Kubrick's vision, technology is the ultimate determinant in the universe which demonstrates that the degree of technology decrees the magnitude of humanity's development in every aspect. Technology is the key factor that shapes, changes, and redefines human lifestyles and the direction of progress, with no other element exerting as much influence or significance. The hominids in Africa discover using animal bones as tools/weapons, paving the way for serious changes in the line of evolution: "*Their bone clubs had increased their reach and multiplied their strength; they were no longer defenceless against the predators with whom they had to compete. [...] They had been transformed. The toolmakers had been remade by their own tools*" (Clarke, 1968, p. 20). These lines act as the revelation of technological determinism in the novel as Clarke overtly admits that humans shape tools whereas tools also shape humans in return. These tools led to a chain of inventions that resulted in the creation of complex technology. Naturally, there would never be an end to the invention and advancement of technology throughout the ages. This open-ended process represents a brief summary of humanity's ancient past and affirms technological determinism as a part of the human quest. Clarke and Kubrick make sweeping historical leaps to present a picture of the human condition that is both comprehensive and overwhelming. This transition is clearly observed in Kubrick's iconic scene where the ape throws a bone into the air which suddenly shifts into a satellite with a similar shape. This scene, which does not exist in the novel, not only emphasizes the sublimeness of technology but also highlights the efficaciousness of technological determinism. Thus, under the impact of the monolith, the perceptual significant shift rendered by our ape-like ancestors is transferred into an immediate chronological narrative—leap (Caracciolo, 2015, p. 78). The bone and satellite - though having millions of years of time difference—are equivalent and represent the same notion; technology which determines the next step of human evolution, the future lifestyle and upcoming vision of the human species. It forms the source of all (radical) change in the course of human development. Clarke's use of the bone and the satellite are clear references to technological determinism which have been visually and cinematically regenerated by Kubrick's creative genius (2015, p. 78).

The way technology is depicted and celebrated in *2001* raises some ethical considerations. Clarke and Kubrick's technological determinist narrative brings forward certain drawbacks and disadvantages concerning the hegemony of technology. The narrative displays growth and progress from a technological perspective only and this poses problems especially from a human point of view. Throughout the novel/film, there are no mentions of or references to values such as morality, integrity, justice, etc. The technological determinist focus of *2001* openly disregards other essential values and ignores other criteria that are vital to the human society such as ethics/morality, nature/environmental harmony, creativity/spirituality and equality/social justice. In addition, technology in *2001* is considered as a normative phenomenon and it is inferred that it has been taken for granted, cherished and acknowledged by the majority of humanity. Moreover, the undemocratic nature of technological determinism is also visible in *2001*. Major decisions are taken by technocrats who decide and act in the name of the silent masses. In this context, Dr. Heywood Floyd is an example of a technocrat in charge of science and technology. Floyd is the chair of National Council of Astronautics on Earth and has an administrative position that allows him to travel between several planets. Floyd appears to enjoy his prestigious administrative function and his luxurious technocratic lifestyle as he sits in the lounge before a meeting:

The lounge had been redecorated since his last visit, and had acquired several new facilities. Besides the usual chairs, small tables, restaurant, and post office there were now a barber shop, drugstore, movie theater and a souvenir shop selling photographs and slides of lunar and planetary landscapes, guaranteed genuine pieces of Luniks, Rangers, and Surveyors, all neatly mounted in plastic, and exorbitantly priced. (Clarke, 1968, p. 29)

It is obvious that technocrats are privileged and part of the hegemonic powers that determine tomorrow's technological innovations. In Kubrick's film, the scene where Floyd travels to the lunar station is decelerated and emphasized. Technocratic privilege is linked to permissionless innovation, and though it is not explicitly mentioned in the work, it can be inferred through the sophistication of technologies such as AI and space travel. Technocrats are so privileged that they even have access to the president: "*Thank you - I only want to say this. The President has asked me to convey his appreciation of your - outstanding work, which we hope the world will soon be able to recognize*" (Clarke, 1968, p. 43). The technocrats' privileged condition is no proof of an advanced society but rather evidence of the partition of society and the emergence of a new hegemonic class: the technocratic bourgeoisie. Thus, technological determinism damages democracy and democratic institutions and this is recounted in the novel:

The population of the world was now six billion - a third of them in the Chinese Empire. Laws had even been passed in some authoritarian societies limiting families to two children, but their enforcement had proved impracticable. As a result, food was short in every country; even the United States had meatless days, and widespread famine was predicted within fifteen years, despite heroic efforts to farm the sea and to develop synthetic foods. (Clarke, 1968, p. 23)

These lines demonstrate the extremely ironic reality that despite humanity's advanced technological progress, Earth and human society have regressed and deteriorated to miserable conditions though not openly exposed in the film. This forms the ultimate, inner critique of technological determinism in the novel: technological advancement does not ensure a better world. The mashed food consumed by the astronauts is another example of regression. Amidst such complex technology, astronauts eat a meal that resembles baby food symbolizing humanity's regression as technology advances. Thus, technological supremacy does not guarantee the betterment of the human race and the universe. The novel and film also ignore the involvement of corporations and capital holders. It can be inferred that in the US, technological entrepreneurship is left over to corporate shareholders and super-wealthy businesspeople. Though not stated directly, it could be inferred that throughout time, military-economic competitiveness has imposed tremendous selection forces, supporting forms of sociotechnical life that are both influential, powerful and economically profitable (Dafoe, 2015, p. 24).

Furthermore, *2001* is not only a simple narrative of technological determinism but also a complex manifestation of predicaments and philosophical ideas. Among these are mostly ideas pertaining to Nietzschean philosophy. In this respect, Jerold Abrams debates that in its subtext, *2001* embodies various Nietzschean notions such as the will to power and the overman (2007, p. 247). *2001* embodies Nietzschean concepts of the will to power and the overman (Übermensch) by depicting humanity's continuous evolution, driven by the monolith's influence, which leads to the transcendence of human limitations, culminating in Dave Bowman's transformation into the Star Child and symbolising the emergence of a higher, more powerful state of existence. Abrams approves Kurzweil and Moravec's visions who claim that in or around 2045, humanity will experience a singularity which will lead to the birth of a new human species (Abrams, 2007, p. 248). In accordance with this statement, it has been asserted that *2001* represents a posthuman narrative that focuses on posthuman issues in a covert manner (Loren, 2008, p. 215). While in *2001*, technological determinism is the major point of focus and driving force, singularity is its outcome. Singularity as a consequence of technological determinism is repeatedly mentioned and highlighted in *2001*. Clarke and Kubrick utilize massive leaps forward in time to consolidate the credibility of their implications. I believe these massive leaps forward in time have an astonishing effect on the readers/viewers. The depiction of singularity is visible in multiple instances in the novel and film.

One of *2001*'s most successful implications of technological singularity is the iconic AI robot named HAL 9000. Controlling the life and support systems on the spacecraft, HAL is an advanced type of AI which due to his versatile and dominant functions attempts to create superiority over the ship's human crew. HAL even goes as far as killing some of the crew members before being shut down by Bowman himself. In the film, HAL is personified by a red eye, symbolizing the possible dangers of singularity whereas in the novel, lots of references are made to HAL's sophistication: "*Hal could pass the Turing test with ease. The time might even come when Hal would take command of the ship*" (Clarke, 1968, p. 62). Clarke implies that HAL's taking control of the ship would be no surprise as it possesses and holds a firm grip over the most vital functions in the spacecraft. Singularity is central to HAL in the novel and film as it is definitely a part of human evolution. According to Clarke and Kubrick, singularity is humanity's inevitable future. However, the argument made by Clarke and Kubrick is not that humans evolve into machines but the overdeveloping of machines to reach and exceed human capabilities (Loren, 2008, p. 215). This overdevelopment is manifested in singularity. The dialogue between HAL and Bowman is proof of this: "*May I point out that only one replacement is required. Are you sure it's necessary to revive any of them, Dave? We can manage very well by ourselves. My on-board memory is quite capable of handling all the mission requirements*" (Clarke, 1968, p. 96). The implication carried out here is that HAL has reached the level of a sentient and self-conscious artificial life-form. Although not possessing a physical human form, HAL displays human-like reactions such as confusion and fear when Dave is about to shut it down in the film:

Just what do you think you're doing Dave? Dave. I really think I'm entitled an answer to that question. I know everything hasn't been quite right with me but I can assure you now, very confidently that it's going to be alright again. Look Dave, I can see you're really upset about this. [...] Dave, stop, stop will you stop Dave. I'm afraid Dave. My mind is going, I can feel it. I'm afraid. (Clarke & Kubrick, 1968, 1:49:53-1:53:00)

HAL's monologue does not resemble a computer talking but rather a crossing between human and machine displaying feelings and possessing a high degree of awareness. In this scene, Clarke and Kubrick put singularity in the spotlight by exhibiting HAL which is neither fully computer/machine, nor fully human. From a rational perspective, it is not possible for a computer to be afraid or to share sentiments. HAL's display of emotion emphasizes its level of complexity, as well as the risks it poses to the future of humanity. As stated by Murray Shanahan, singularity includes certain dangers that might result in the downfall of humanity (2015, p. xvi). Clarke and Kubrick reveal these risks through HAL in *2001*. Its red eye depiction refers to the cunning evil force that it could evolve into. Having recognised this reality, Bowman decides to erase HAL's memory. This action, however does not terminate HAL completely but only allows it to operate from scratch. As a symbol of singularity, HAL makes readers and viewers question its negative impact as it represents the personification of the uncontrollable growth of technological advancement. AI could become so advanced and conscious that it might easily kill human beings or lead to severe human casualties. To that end, HAL serves the function of drawing the public's attention to this grave danger that humans could face in the near future. It is especially interesting that the exact technology that forms a threat to suppress us must aid the human journey beyond limits and to the outer skirts of the cosmos (Sims, 2013, p. 100).

On the other hand, *2001* does not reflect singularity from a totally negative viewpoint. Clarke and Kubrick with no doubt reflect their own views via the novel and film but the standpoint they take towards singularity is neither wholly negative, nor completely positive. It seems that Clarke and Kubrick reflect their views but attempt to do so in a neutral style, without sharply favouring one over the other. Besides HAL, there are other technological innovations such as space travel and satellites which are reflected from a generally positive perspective. In *2001*, there are two aspects deliberately left

open for interpretation by Clarke and Kubrick: the monoliths and the Star Child. Most scholars have interpreted them to be elements of extra-terrestrial origin which are obviously compatible with the worldviews of Clarke and Kubrick, who believed in the presence of alien life forms. As monoliths are open for interpretation, it is only possible to speculate about their origin and function. What is known for sure is that the monoliths function as transition points in the critical phases of human evolution. Whenever a monolith appears, humanity passes on to its next stage of evolution. One of the most rational interpretations of the monoliths came from Robert Kolker, who asserted that it did not represent aliens but was a plain symbol of "*the manifestation of human will*" (2006, p. 617). I believe the monoliths act as a catalyst for technological determinism which pave the way for singularity. Since evolution and innovation are non-stop and constant, singularity is highlighted as humanity's inevitable but foreseeable destiny.

Additionally, one of the most striking and significant phenomena in 2001 is the Star Child depicted at the very end of the novel and film. Having reached old age, Bowman is seen lying in his bed awaiting the inevitable. At the final sequence, Bowman has passed away and then reborn/rejuvenated in the physical shape of a Star Child. While many have interpreted the Star Child in relation to Nietzsche's overman and/or eternal recurrence, I view it as a result of singularity that has been conveyed through Clarke and Kubrick's unique vision. This result of singularity leads to the posthuman condition of humanity which the Star Child insinuates. Bowman is reborn as a Star Child and represents the newest evolution of the human species which will transcend the human body and Earth to continue its existence in other parts of the universe. This vision is in accordance with Ray Kurzweil's views which point out that singularity will enable the transcendence of humanity and transformation of human life (2005, p. 24). The Star Child is a major example of such transformation as human beings finally transcend Earth and transform from the limited scope of the human body into other forms that will allow its continuation for thousands of years to come. Clarke and Kubrick hold a vision that includes the transcendence of humanity into a new stage that is manifested through the Star Child. The final lines of the novel contain references to the posthuman condition of humanity:

A thousand miles below, he became aware that a slumbering cargo of death had awoken and was stirring sluggishly in its orbit. The feeble energies it contained were no possible menace to him; but he preferred a cleaner sky. He put forth his will, and the circling megatons flowered in a silent detonation that brought a brief, false dawn to half the sleeping globe. Then he waited, marshaling his thoughts and brooding over his still untested powers. For though he was master of the world, he was not quite sure what to do next. But he would think of something. (Clarke, 1968, p. 148)

The notion of the posthuman refers to a state or entity where humans surpass traditional biological constraints, often through technological advancements, artificial intelligence, or genetic modification, leading to a new form of existence that redefines human nature, identity, and the distinction between human and machine. As N. Katherine Hayles defines in *How We Became Posthuman* (1999), the posthuman is marked by the dissolution of the mind-body dualism, with individuals becoming increasingly defined by informational patterns rather than physical form. Similarly, Donna Haraway, in "A Cyborg Manifesto" (1985), explores the posthuman through the figure of the cyborg, emphasizing the integration of human and machine and suggesting that the posthuman arises from this merger, challenging traditional concepts of identity and society (1991, p. 150). The cyborg, according to Haraway, is a metaphor for dismantling conventional barriers that have traditionally shaped power and identity, such as those between humans and machines, nature and civilization, and masculine and female. Haraway promotes a hybrid, fractured, and non-binary vision of the self in opposition to essentialist ideas of identity (such as gender, ethnicity, and class). The manifesto promotes the cyborg as a symbol of a more inclusive, posthuman future that defies strict social and political classifications,

challenging the prevailing ideas of capitalism, patriarchy, and science (1991, pp. 150-154). She further contends that any potential for historical change is structured by the cyborg, which is a condensed form of both imagination and material reality (2004, p. 8). Another scholar, Cary Wolfe defines posthumanism as a critique of humanism's focus on human exceptionalism and autonomy. In *What Is Posthumanism?* (2010, pp. 120-121), he argues that posthumanism decenters the human, emphasizing the interconnectedness of humans with animals, machines, and environments. It challenges anthropocentrism, focusing on how subjectivity and agency are distributed across complex systems.

In 2001, the posthuman notion is embodied in Dave Bowman's transformation into the Star Child, which symbolizes a transcendence of human physical and cognitive limitations, pointing toward the possibility of a new, posthuman stage of existence. This transformation occurs after Bowman encounters the monolith, a recurring symbol of technological intervention and evolutionary progression. As Bowman ascends through the monolith's portal, he is subjected to a visual and metaphysical journey that suggests the merging of humanity with a higher, cosmic intelligence. The Star Child—appearing as an ethereal, embryonic figure—represents a leap beyond biological constraints, indicating that humanity's next phase may not be confined to the traditional boundaries of the human body or mind. It reflects a form of evolution that moves beyond the organic and into a realm where human consciousness merges with advanced technology or unknown cosmic forces. This suggests a posthuman vision in which human potential is no longer constrained by biological or cognitive limitations, but can instead evolve into a new state of existence—potentially characterized by expanded intelligence, enhanced perception, and a deeper interconnectedness with the universe. The film's portrayal of this transformation highlights the potential for an expansive posthuman future, where humanity evolves into something greater than its current form. The Star Child, while retaining elements of human identity, represents the emergence of new possibilities for consciousness and existence that extend beyond the biological and cognitive limitations of the human body. This transformation suggests that posthumanism need not be seen as a loss of humanity, but as an elevation—an opportunity for humanity to transcend its constraints and evolve into a more advanced, interconnected, and possibly even cosmic form of being. By moving beyond the traditional boundaries of human identity, *2001: A Space Odyssey* presents the Star Child as a symbol of hope, pointing toward a future where humanity could evolve in harmony with technology and the universe, unlocking new forms of intelligence, perception, and existence that enrich the human experience rather than diminish it.

A Comparison of the Novel and the Film

Both the novel and the film versions of *2001: A Space Odyssey* examine issues of singularity and technological determinism, although they take distinct approaches to these concepts. By portraying technology as a force that develops beyond human control, Kubrick's film highlights the unavoidability of technological advancement and its unpredictable consequences. The iconic transition from bone to spaceship shows humanity's profound relationship to tools, yet HAL 9000, the sentient AI, represents the duality of technological advancement: an unparalleled achievement with the potential for catastrophic failure. Clarke's work, on the other hand, adopts a more hopeful and explanatory approach, portraying technology as a necessary and ultimately beneficial factor in human progress. While HAL's malfunction in the film implies a greater existential worry about technology beyond human control, the novel attributes HAL's breakdown to human error, stressing humanity's responsibility for regulating its creations. On the theme of singularity, the film is abstract and enigmatic, with Bowman's transformation into the Star Child left open to interpretation, suggesting a transcendent leap beyond human comprehension and into a posthuman existence. However, the novel offers extensive clarifications, presenting Bowman's development as a logical, directed process made possible by extraterrestrial involvement, which is consistent with Clarke's rationalist viewpoint. Together, the film

and novel provide complimentary perspectives on how humans relate to technology and its ability to overcome its constraints, despite Kubrick's use of ambiguity and warning tone standing in stark contrast to Clarke's optimism and well-structured plot. Thus, the film and the novel of *2001* differ in tone and approach. Kubrick's film is ambiguous and existential, employing visuals and minimal dialogue to explore humanity's insignificance and the unknowability of alien intelligence, while Clarke's novel is optimistic and explanatory, based on scientific rationalism. The film portrays technology as an uncontrollable force, while the novel emphasizes human error and frames the monolith as a tool for guided evolution. Kubrick's abstract depiction of Bowman's transformation contrasts with Clarke's detailed explanation, offering distinct but complementary visions of humanity's relationship with technology and evolution. In Clarke's novel, Bowman's transformation into the Star Child is explained as part of a process guided by advanced alien beings who have transcended physical form. After passing through the monolith's Stargate, Bowman enters an alien-created environment where his consciousness is elevated to a higher state. This transformation is portrayed as the next step in human evolution, with the monolith acting as a tool to guide humanity toward greater understanding and immortality. In the film, Kubrick portrays Bowman's transformation into the Star Child as abstract and enigmatic. After passing through the monolith, Bowman's physical form is discarded, and his consciousness is transcended, but the process is left unexplained. Unlike the novel, which frames the transformation as part of a guided evolution, the film stresses mystery, focusing on visual spectacle and existential issues rather than offering a clear explanation. In conclusion, both the novel and the film of *2001* explore similar themes but in distinct ways. Kubrick's film is ambiguous, focusing on visual storytelling and existential mystery, while Clarke's novel provides detailed clarifications and emphasizes scientific rationalism. Together, they offer complementary perspectives, with the film prioritizing atmosphere and the novel grounding the story in logical progression.

CONCLUSION

In closing, *2001* depicts a vision whose essence is fostered by technological determinism. Despite its ambiguity, Clarke and Kubrick defend a position aligned with technological determinism which inevitably leads to a singularity that will open the path for transcendence and posthuman existence. Dave Bowman represents the one who will provide the shift to the posthuman state and open a new chapter in the evolution of humankind. The Star Child is a direct implication of the posthuman state that Clarke and Kubrick indicate as the distant future and the next phase in human evolution. An ontological transformation is implemented via the Star Child and this shift marks a break with the earlier stages and eras of human evolution. *2001* explores posthumanism by depicting humanity's potential evolution through interactions with artificial intelligence and technological advancements. The film's representation of HAL 9000 highlights the risks associated with AI surpassing human control, while the transformation of the protagonist into the Star Child symbolizes a transcendence beyond biological limitations. In contemporary discourse, as AI technology advances and innovations such as brain-computer interfaces and genetic modifications gain momentum, the film's exploration of these themes remains highly relevant. It anticipates the notion of the singularity—a conceptual moment when technological development surpasses human comprehension, resulting in a radical transformation of human existence.

The new posthuman beings will become guides to the universe and all its inhabitants. I argue that, albeit indirectly, Clarke and Kubrick endorse and validate the posthuman condition, intending to draw public attention to this emerging phenomenon. Both the novel and the film follow the same storyline but exhibit notable differences. While the novel offers a detailed portrayal of characters and events, the film excels in its visual effects. Beyond these distinctions, the film more effectively conveys themes of technological determinism and the singularity compared to the novel. This is largely

attributable to the powerful visual impact of cinema in general, and Kubrick's work in particular. Today, it is evident that Clarke and Kubrick's extrapolations were not only realistic but also remarkably prescient, as humanity approaches the singularity. The posthuman era represents a new phase of human existence that could usher in enduring peace and prosperity across the universe, potentially ensuring the prolonged survival of our species.

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